CLAIMS

What is claimed is:

1. A method of producing a protein bioarray comprising:
   a) providing a substrate comprising a solid support and a surface modification layer bound to the solid support, the surface modification layer comprising at least a first moiety having the structure —Si—R^1 and a second moiety having the structure —Si—L—R^2, wherein R^1 is a chemically inert moiety selected from the group consisting of C_3 to C_{30} alkyl and benzyl optionally substituted with 1 to 5 halogen atoms, L is a linking group, R^2 is a chemically inert hydrophilic moiety,
   b) providing at least two solutions, each solution comprising a probe protein, and
   c) depositing the solutions provided in step b) onto discrete sites on the substrate, each solution being deposited onto its own discrete site, wherein each probe protein becomes non-covalently attached to the substrate at its respective discrete site.

2. The method of claim 1, further comprising drying the substrate after depositing the solutions.

3. The method of claim 1, further comprising, after step c),
   d) contacting the substrate with a blocking composition comprising a blocking protein, wherein the blocking protein becomes non-covalently attached to the substrate

4. The method of claim 3, wherein the discrete sites are separated by intervening areas, and the blocking protein becomes non-covalently attached to the substrate at the intervening areas and at the discrete sites.

5. The method of claim 3, wherein the blocking composition comprises a plurality of blocking proteins.

6. The method of claim 5, wherein the plurality of blocking proteins are selected to provide low background signal relative to binding of target protein by the probe proteins.

7. The method of claim 1, wherein at least one solution provided in step b) comprises a probe protein that is different from at least one other probe protein in another solution provided in step b).

8. The method of claim 1, wherein least fifty solutions are provided in step b).

9. The method of claim 1, wherein least 250 solutions are provided in step b).

10. The method of claim 1,wherein depositing the solutions comprises using an inkjet apparatus to deliver one or more droplets of each solution to its respective discrete site.

11. A protein bioarray comprising

a substrate comprising a solid support and a surface modification layer bound to the solid support, the surface modification layer comprising at least a first moiety having the structure —Si—R^1 and a second moiety having the structure —Si—L—R^2, wherein R^1 is a chemically inert moiety selected from the group consisting of C_3 to C_{30} alkyl and benzyl optionally substituted with 1 to 5 halogen atoms, L is a linking group, R^2 is a chemically inert hydrophilic moiety;

a plurality of discrete sites on the substrate, each site having a probe protein bound thereto via non-covalent interaction.

12. The protein bioarray of claim 11, further comprising intervening areas between the discrete sites.

13. The protein bioarray of claim 11, further comprising a blocking protein bound to the substrate.

14 The protein bioarray of claim 11, wherein each discrete site is in the range from 30 to 150 micrometers in diameter.

15 The protein bioarray of claim 11, wherein the solid support comprises a material selected from glass; fused silica; plastic, polytetrafluoroethylene, polystyrene, polycarbonate, ceramic, titanium dioxide.

16. The protein bioarray of claim 11, wherein the second moiety comprises from about 0.5% to about 99.5% of the modification layer.

17. The protein bioarray of claim 11, wherein the second moiety comprises from about 0.5% to about 30% of the modification layer.

18. The protein bioarray of claim 11, wherein R^2 is selected from hydroxyl, acetyl, carboxyl, amino, amide, methoxyl, ethoxyl, propoxyl, and —$(OCH_2CH_2)_k$—H where k is an integer from 1 to about 10.